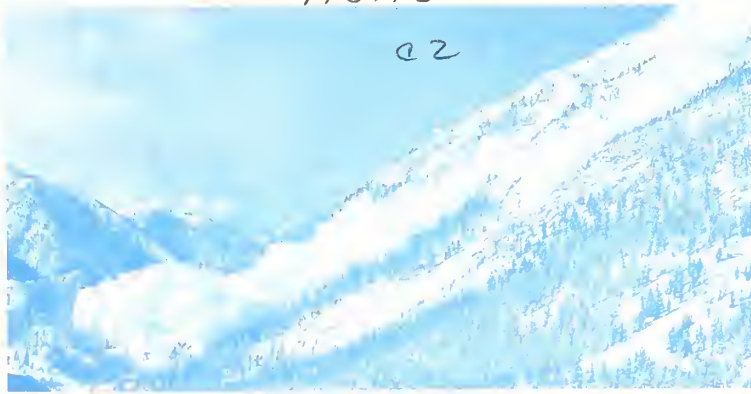


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Avalanche Notes

U.S. Forest Service
Westwide Avalanche Network

APRIL 1991

April snowfall was well above normal along a storm track extending from Alaska through the Cascades of Washington and Oregon through the Wasatch of Utah and into Colorado. Alyeska, AK received 39" of snow on the 15th-17th and ended the month with 120% of normal. In the Cascades, Mt. Rainier and Stevens Pass, WA both received 190% of normal. Most of this snow fell in a major storm on the 3rd-10th: Mt. Rainier got 55" on the 4th-5th, and 110" on the 3rd-10th. Mt. Hood Meadows, OR was helped by 36" on the 8th-10th and ended up with 120% of normal.

In Utah, Snowbird recorded 180% of normal for the month. Two big storms helped Snowbird: 53" on the 10th-14th and 62" on the 26th-30th. In Colorado, Gothic recorded 140% of normal while Berthoud Pass and Winter Park both had 136%. Snow fell daily the last 10 days of April in most of the Colorado mountains; Arapahoe Basin received 46" during this time.

The Sierra of California was south of the storm track and thus got skipped. Alpine Meadows got 58% of normal, and Mammoth Mountain, even further south, only 10%.

A total of eight avalanche incidents were reported in April, resulting in 13 people being caught and 5 partly buried. The most serious incident occurred on the 4th at Tuckerman Ravine, Mt. Washington, NH when four members of a group were buried to the neck by an avalanche they had triggered.

Jill Fredston and Doug Fesler report that on April 30 at 11:19 pm a 6.0-Richter earthquake hit the Denali area of Alaska. Huge avalanches of ice and snow resulted. Eyewitnesses describe the entire Wickersham Wall on the north face of Mt. Hunter as just falling off, dropping snow and ice 5,000' vertical and miles horizontal. At least three camps of climbers in the Ruth Glacier vicinity were buffeted and dusted by the powder blast. The earthquake triggered large avalanches throughout the Alaska Range. Apparently, all parties have been accounted for.

Tragedy occurred on April 28 at Whistler, BC, Canada when one patroller was killed and another seriously injured in an avalauncher accident. They were using a Canadian-made prototype when a round exploded in the barrel. This weapon is not related in any way to US-made avalaunchers.

WINTER SUMMARY

Table 1 lists avalanche statistics for the past 21 winters. This year was below average in the number of avalanches reported, and well below normal in avalanche deaths -- only seven reported through the end of April. Property damage was minuscule. Clearly, these low figures result from the meager snowfall that accumulated over most of the mountain West from November-February.

Table 2 presents snowfall totals for all Westwide sites with complete weather data for the 4-month period of December-March. Only six sites -- all in Colorado -- wound up above normal for the 4-month core of winter. Of course, heavy snowfall in March helped boost the totals for most sites. Snowbird, UT benefited the most with snow accumulations in November and April -- 84% of normal for December-March, and 105% for November-April.

Table 3 lists avalanche totals for all sites reporting this winter.

LOOKING AHEAD

Don't forget the National Avalanche School to be held in Denver, CO on November 7-11, 1991. For further information, write: National Avalanche Foundation, 133 South Van Gordon St., Suite 100, Lakewood, CO 80228.

Table 1: Annual avalanche summaries for the U.S.

WINTER	AVALANCHES	PEOPLE				VEHICLES		AVALANCHE DAMAGED			ESTIMATED PROPERTY DAMAGE
		C	B	I	K	BUR	DAM	BLDGS	LIFTS	MISC	
1990-91	7,046	129	52	9	7	8	2	2	0	0	\$ 10,000
1989-90	6,122	140	57	16	7	14	8	3	0	3	150,000
1988-89	7,385	143	55	4	7	33	6	2	0	8	2,215,000
1987-88	5,338	148	50	13	8	7	5	2	0	25	650,000
1986-87	5,036	128	62	13	23	5	0	3	0	1	175,000
1985-86	7,437	102	49	11	15	18	7	6	1	3	150,000
1984-85	6,903	115	42	18	14	8	0	4	0	2	80,000
1983-84	7,161	122	42	20	14	27	7	4	0	6	140,000
1982-83	11,822	174	68	20	14	32	11	5	4	3	80,000
1981-82	10,102	212	78	16	19	77	25	10	8	8	1,700,000
1980-81	5,695	131	58	7	23	5	1	0	2	0	10,000
1979-80	10,669	136	44	9	6	34	16	7	1	19	650,000
1978-79	9,420	159	62	16	11	54	24	5	1	4	1,250,000
1977-78	11,151	155	71	16	17	19	5	5	3	2	300,000
1976-77	3,764	98	35	13	10	3	0	2	0	0	500
1975-76	7,905	177	81	15	17	13	6	1	1	1	100,000
1974-75	10,387	195	79	9	22	30	5	4	1	2	150,000
1973-74	11,782	159	92	13	13	54	16	11	2	7	300,000
1972-73	9,965	92	35	3	5	11	1	4	2	2	200,000
1971-72	6,975	168	63	17	5	21	4	11	2	12	300,000
1970-71	4,066	58	46	10	12	19	3	13	2	8	500,000
AVERAGE	7,910	139	58	13	13	23	8	5	2	6	\$ 434,000

Table 2: Snowfall totals for the winter of 1990-91

<u>State and Site</u>	<u>Dec-Mar (inches)</u>	<u>% of Normal</u>	<u>Nov-Apr (inches)</u>	<u>% of Normal</u>
Alaska				
Alyeska	300	83%	442	
California				
Alpine Meadows	254	88%	289	85%
Heavenly Valley	137			
Kirkwood Meadows	265			
Squaw Valley	162	71%		
Colorado				
Arapahoe Basin	202	97%		
Aspen Highlands	150	88%		
Aspen Mountain	173	106%		
Aspen Snowmass	163			
Bear Lake	130		191	
Beaver Creek	237	112%		
Berthoud Pass	211	104%	314	104%
Breckenridge	145	68%		
Cooper	118			
Copper Mountain	190	109%		
Crested Butte	148	90%		
Eldora	123			
Gothic	271	116%	384	118%
Loveland Basin	208	91%		
Monarch	172	91%		
Purgatory	178	97%		
Red Mountain Pass	166	78%		
Steamboat	239	97%		
Sunlight	165	92%		
Telluride	159	86%		
Vail	269	102%		
Winter Park Ski Area	235	92%		
Winter Park Town	149	97%	219	98%
Wolf Creek	266	98%		
Idaho				
Sun Valley	96	65%		
Montana				
Big Mountain	256			
Bridger Bowl	202	87%		
Oregon				
Mt. Hood Meadows	182	48%		
Utah				
Parkwest	220			
Snowbird	287	84%	505	105%
Solitude	289			
Washington				
Crystal Mountain 1	213	82%		
Crystal Mountain 2	238	68%		
Mt. Rainier-Paradise	406	81%		
Snoqualmie Pass	280			
Stevens Pass	291	85%		
Stevens Pass U.S. 2	279			
Wyoming				
Jackson Hole	214	74%		

Table 3: Avalanche totals for the winter of 1990-91

Ski Areas	No.	Highways, Mines, Nat. Parks and Backcountry Areas	No.
1. Snowbird, UT	783	1. Gothic, CO	158
2. Stevens Pass, WA	679	2. Stevens Pass U.S. 2, WA	115
3. Alpine Meadows, CA	668	3. Snoqualmie Pass I-90, WA	76
4. Crystal Mountain, WA	576	4. Sawtooth Range, ID	75
5. Bridger Bowl, MT	446	5. Loveland Pass, CO	47
6. Solitude, UT	338	6. Berthoud Pass Res. Area, CO	46
7. Big Sky, MT	288	7. Red Mountain Pass, CO	22
8. Kirkwood Meadows, CA	271	8. Urad-Henderson Mine, CO	15
9. Mt. Hood Meadows, OR	256	9. Vail Pass, CO	14
10. Sugar Bowl, CA	254	10. Berthoud Pass U.S. 40, CO	9
11. Squaw Valley, CA	246	11. Teton Pass, WY	6
12. Alyeska, AK	187		
13. Aspen Snowmass, CO	161		
14. Aspen Highlands, CO	157		
15. Wolf Creek, CO	151		
16. Jackson Hole, WY	139		
17. Big Mountain, MT	111		
18. Arapahoe Basin, CO	106		
19. Breckenridge, CO	83		
20. Telluride, CO	81		
21. Taos, NM	76		
22. Crested Butte, CO	70		
23. Park West, UT	57		
23. Copper Mountain, CO	57		
25. Monarch, CO	44		
26. Mammoth Mountain, CA	36		
27. Loveland Basin, CO	32		
28. Vail, CO	24		
28. Winter Park, CO	24		
30. Aspen Mountain, CO	18		
31. Sun Valley, ID	17		
32. Steamboat, CO	13		
33. Heavenly Valley, CA	10		
34. Beaver Creek, CO	1		
34. Ski Cooper, CO	1		
34. Sunlight, CO	1		
34. Keystone, CO	1		

U.S. FOREST SERVICE
ALPINE SNOW AND AVALANCHE RESEARCH PROJECT
RM STATION FORT COLLINS, COLO.

APRIL 1991

SUMMARY OF WEATHER AND SNOW CONDITIONS

AREA	SNOWFALL			WATER EQUIVALENT			SNOW DEPTH			TEMPERATURE			WIND SPEED AND DIRECTION		
	TOTAL SNOW-FALL IN.	AVG DEN	MAX IN.	TOTAL WATER IN.	MAX IN.	D	A	T	E	MAX IN.	MIN IN.	AVG IN.	MAX	MEAN	F
CENTRAL AND SOUTHERN ROCKY MOUNTAINS															
ARAPAHOE BASIN, COLO	86.0	--	14 13	--	--	--	--	--	--	83 29	59	69	32.0	10.7	21.4
BEAR LAKE, RMNP, CO	35.5	.08	8 13	2.77	.90	13	13	6	2	50 14	38	43	33.8M	22.2M	28.0M
BERTHOUD PASS, COLO	72.7	.07	17 12	5.11	.92	13	13	11	4	78 30	58	67	33.5	11.2	22.6
COPPER MTN, COLO	49.5	.07	7 12	3.60	.50	13	13	8	2	57 12	46	51	41.4M	14.2M	27.8M
GOthic, COLO	59.0	.07	8 26	3.93	.53	26	14	9	1	67 2	48	56	32.9	11.0	21.9
WINTER PARK 1E, COLO	51.2	.07	8 12	3.57	.64	12	12	5	1	53 13	38	44	40.1	15.6	27.9
INTERMOUNTAIN															
SNOWBIRD, UTAH	130.0	.07	22 11	9.64	2.00	26	13	13	7	94 28	55	70	41.3	23.9	32.6
WEST COAST															
ALPINE MEADOWS, CAL	19.0	.15	8 25	2.82	.98	25	19	13	3	82 1	53	62	44.1	26.9	35.5
ALYESKA, ALASKA	102.8	.09	18 22	11.63	1.60	30	19	13	9	120 22	94	103	38.2	29.3	33.8
MAMMOTH MTN, CALIF	4.0	--	4 21	--	--	--	--	--	--	88 1	62	72	--	--	--
MT. HOOD MDWS, ORE	71.1	.11	15 9	8.57	1.76	9	14	9	7	118 10	78	94	39.9M	26.0M	33.0M
MT. RAINIER PARADISE	146.0	.10	28 4	14.73	3.63	5	17	13	8	222 10	157	187	39.6	25.4	32.5
SQUAW VALLEY, CALIF	5.4	.11	25	1.67	.66	6	5	3	1	36 1	3	17	46.8	25.7	36.3
STEVENS PASS, WASH	59.0	.11	12 4	7.12	1.85	5	11	9	6	113 10	88	95	43.1M	29.6M	36.4M
STEVENS PASS 5E WASH	58.0	.16	10 6	10.58	3.46	5	11	11	8	--	--	--	--	--	--
SUGAR BOWL, CALIF	20.0	--	6 25	--	--	--	--	--	--	130 1	101	111	44.2	23.7	34.0

-- DATA INCOMPLETE OR MISSING
M--ONE OR MORE DAYS OF RECORD MISSING--IF AVERAGE VALUE IS ENTERED, LESS THAN 10 DAYS RECORD IS MISSING
GE--GREATER THAN OR EQUAL TO
IF M IS ENTERED IN WIND SPEED COLUMN, LESS THAN 37 6-HOUR PERIODS ARE MISSING

U.S. FOREST SERVICE
ALPINE SNOW AND AVALANCHE RESEARCH PROJECT
RM STATION FORT COLLINS, COLO.

APRIL 1991
AVALANCHE SUMMARY

AREA	TOTAL		DATES OF		MAX IN ONE DAY NO.	NUMBER OF DAYS WITH		TYPE OF AVALANCHE		FRACTURE LINE HEIGHTS IN FEET		VERTICAL DESCENT IN FEET		AVALS ACROSS MAJOR ACCESS ROADS NO.
	THIS MONTH NO.	THIS WINTER NO.	FIRST	LAST		AVALANCHES	SLABS	NUMBER	NUMBER	GEOMETRIC MEAN	GEOMETRIC MEAN	GEOMETRIC MEAN	MAX FEET	
CENTRAL AND SOUTHERN ROCKY MOUNTAINS														
ARAPAHOE BASIN, COLO	9	106	1	29	6	4	0	0	1	3	0	7	4	1
ASPEN HIGHLANDS, COL	8	157	4	27	3	0	0	0	0	8	0	0	0	0
ASPEN MOUNTAIN, COLO	7	157	5	6	4	0	0	0	0	6	0	0	0	0
GOTHIC, COLO	16	158	4	30	4	0	0	0	0	0	0	0	0	0
LOVELAND BASIN, COLO	9	32	12	29	3	0	0	0	0	15	0	0	0	0
WINTER PARK S.A., CO	15	24	6	30	6	0	0	0	0	10	0	0	0	0
MONARCH, COLORADO	11	44	5	5	11	0	0	0	0	10	0	0	0	0
INTERMOUNTAIN														
BIG MOUNTAIN, MONT	2	111	11	11	2	1	0	0	0	0	0	0	0	0
SNOWBIRD, UTAH	69	783	2	30	11	9	0	0	0	0	0	0	0	0
WEST COAST														
ALPINE MEADOWS, CAL	23	668	1	26	13	3	0	0	0	0	0	0	0	0
ALYESKA, ALASKA	44	187	5	30	15	12	0	0	0	0	0	0	0	0
CRYSTAL MTN, WASH	158	576	3	13	7	0	0	0	0	0	0	0	0	0
KIRKWOOD MDWS, CAL	15	271	2	26	7	3	0	0	0	0	0	0	0	0
MT. HOOD MEADOWS	50	256	6	27	10	8	0	0	0	0	0	0	0	0
SQUAM VALLEY, CALIF	17	246	3	23	11	2	0	0	0	0	0	0	0	0
STEVENS PASS, WASH	113	679	3	23	28	5	0	0	0	0	0	0	0	0
STEVENS PASS, U.S.	15	115	3	15	5	5	0	0	0	0	0	0	0	0

--=DATA INCOMPLETE OR MISSING
GE=GREATER THAN OR EQUAL TO
+=ALSO OCCURRED ON OTHER DATES